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ABSTRACT

To support the New York State Education Department's efforts, a project was carried out to design and implement information and reporting systems that serve the needs of occupational information. Technical assistance was provided throughout the project to implement an occupational education reporting system in New York City and coordinate that system with other developing information systems. Functional specifications were developed for meeting information requirements of the New York City School District's Office of Occupational and Career Education. Emphasis was placed on three major applications for which data processing support was needed: a system for program monitoring and evaluation, enrollment and follow-up data from a comprehensive student information system, and information system for adult education programs. The project also carried out refinements in the State Occupational Education Reporting System. Other project activities were directed toward the specification of a reporting system for the new, competency-based vocational education curricula. Rather than extending the Instructional Support System for Occupational Education to meet new priorities, a new process, commonly referred to as futuring, was adopted as the principal vehicle to establish competency-based occupational education in New York State. (The four stages of bringing the reporting system into operation and operating it are described.) (YLB)

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COLLECTING AND REPORTING OCCUPATIONAL EDUCATION INFORMATION

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Institute for Research and Development in Occupational Education
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in cooperation with the
OFFICE OF OCCUPATIONAL AND CONTINUING EDUCATION
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CASE 07-81
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Preface

As of July 1, 1980, the Institute for Research and Development in Occupational Education (IRDOE) was retained by the New York State Education Department to provide assistance for the design and implementation of student accounting and reporting systems for occupational education.

In order to maintain continuity of effort without straining personnel resources to the limit, the Institute contracted with Metis Associates, Inc. to carry out the activities described in this report. Metis Associates carried out its work for IRDOE under contract GC 81-23 between Metis Associates, Inc. and the Research Foundation of the City University of New York.*

This final report is submitted to the State Education Department in partial fulfillment of project requirements. The report describes work undertaken for the period July 1, 1980 through June 30, 1981.

Lee Cohen, Director
IRDOE

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*Collecting and Reporting Information on Occupational Education. A proposal by Metis Associates, Inc. submitted to the Institute for Research and Development in Occupational Education, City University of New York, 1980.

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I. Introduction

The New York State Education Department's Office of Occupational and Continuing Education (SED:OOCE) has been improving the timeliness, validity, and utility of information that is used to plan, manage and evaluate occupational education programs. The basis for SED:OOCE's efforts goes beyond the need to meet mandated reporting requirements. Local education agencies and the department itself need timely, relevant and reliable information about the students who are served, occupational program effectiveness, job markets, and program costs.

In order to obtain information on occupational programs, SED:OOCE has sponsored the development of occupational education information systems. These systems are intended to supply the data needed by agencies delivering occupational education services and needed by agencies regulating, monitoring, and funding the delivery of these services. The State Education Department's objective in developing these systems is to insure that information requirements can be met with the least possible redundancy, the greatest possible statewide compatibility, and at the lowest feasible cost.

SED:OOCE and the State Education Department's Information Center on Education (ICE) have undertaken the development and statewide implementation of a New York State Occupational Education Reporting System (OERS). This system provides information to SED:OOCE needed for planning, evaluating and monitoring the state's occupational education programs, for providing feedback to local education agencies, and for fulfilling state- and federally-mandated reporting requirements. OERS generates standard, auditable information for state purposes, while providing considerable flexibility to

local education agencies, Boards of Cooperative Educational Services and other local users of information on occupational education.

As part of its statewide program, SED:OOCE has undertaken the implementation of OERS in the School District of the City of New York. The New York City version of OERS that currently is being implemented fulfills the SED:OOCE's information requirements while accommodating the substantial size, heterogeneity, organization and other unique characteristics of New York City's occupational education program.

In addition to the implementation of OERS, a basic reporting system, SED:OOCE has been planning additional reporting system capability needed to implement new, competency-based vocational curricula that currently are being developed.

The Information Center on Education (ICE) has had a major responsibility in devising and implementing information systems that meet SED:OOCE's programmatic requirements.

A. Purposes of the Project

In support of the State Education Department's efforts to design and implement information and reporting systems that serve the needs of occupational education, the Institute for Research and Development in Occupational Education carried out the project described in this final report. The project's four major purposes are listed below.

- To design and implement major changes in the New York City School District's occupational education reporting system to facilitate coordination with the City School District's recently developed student data system.
- To develop functional specifications for meeting selected information requirements of the New York City school district's Office of Occupational and Career Education.

- To specify refinements in the State Education Department's (SED) Occupational Education Reporting System (OERS).

- To develop a process for specifying the reporting and evaluation systems necessary to insure the effective and efficient management of SED:OOCE's new, competency-based vocational education curricula.

B. Organization of this Report

The following four sections of this report describe the activities carried out within this project to meet each of the project's four major purposes. Section II describes the technical assistance activities undertaken through this project to: 1) implement an occupational education reporting system in New York City, and 2) coordinate that system with other developing information systems. Section III of this report describes work carried out to meet information requirements of the New York City School District's Office of Occupational and Career Education (NYC:OOCE) that currently are not met through the City's version of OERS. Section IV describes refinements in statewide occupational reporting systems that were carried out with assistance from this project. Section V describes project activities directed toward the specification of a reporting system for SED:OOCE's new vocational curricula.

II. The Development and Implementation of an Occupational Education Reporting System for the School District of the City of New York

Tasks 1 and 2 of this project's statement of work are concerned with providing technical assistance to the New York City school district's Office of Occupational and Career Education. Technical assistance was provided throughout the course of this project to: 1) enable NYC:OOCE to meet its local and state-mandated reporting requirements (Task 1), and 2) establish a linkage between NYC:OOCE's occupational education reporting system and the city school district's developing student data system (Task 2). The following paragraphs provide background information and a description of the technical assistance that was provided to NYC:OOCE through this project.

A. Background

In the development and implementation of the statewide Occupational Education Reporting System (OERS), two interrelated information requirements have been emphasized. These requirements are: 1) the collection and analysis of information about students who are enrolled in occupational programs, and 2) the collection and analysis of information about students who were formerly enrolled in occupational programs (follow-up studies). These requirements are described in the following paragraphs.

Information on secondary students currently enrolled in occupational programs. Local and regional education agencies offering occupational education at the secondary level are required to report annually the frequencies of students served, partitioned by school or site in which programs are offered, occupational subjects, and type of program (regular or cooperative). Within each of these catagories,

enrollment frequencies are further partitioned by the following student characteristics: sex, race/ethnicity and special populations served (e.g., special education students, handicapped students, economically and socially disadvantaged students, and students with limited English proficiency). The enrollment data generally are to be unduplicated; students are to be counted once regardless of the number of occupational courses in which they are enrolled. Such enrollment data are needed for a variety of planning functions at the local level. These data also are needed to comply with reporting requirements emanating from two federal sources, the National Center for Educational Statistics and the Office for Civil Rights. The data are used in the state's formula for distributing federal funds for vocational education, and to obtain an additional allocation of state aid.

Adult occupational enrollments. Unduplicated frequencies of adult enrollments also are needed. Total enrollment counts for adults are to include all program terms: summer, fall and spring. Adult enrollment frequencies must be partitioned by essentially the same factors as secondary enrollments. Adult enrollments also are partitioned by the students' objectives for enrolling in the program: preparing for a new job, supplementing skills for a presently held job, or apprenticeship training.

Information on secondary students formerly enrolled in occupational programs. Education agencies offering occupational programs are required to conduct a follow-up survey of program completers and drop-outs. The objective of the follow-up survey is to determine whether students are continuing their education or have obtained employment in fields that are related to their occupational training. The follow-up results must be partitioned by many of the same factors as the secondary enrollment counts. The results are used to assess the impact of occupational programs on occupational students in general as well as on several subpopulations of students. The return

rate of the follow-up survey must be reasonably high, so that valid inferences may be drawn from the survey results.

Information on adult students formerly enrolled in occupational education programs. Follow-up results for adult completers and leavers also are obtained through a follow-up survey. The follow-up survey includes student leavers and completers in each of the three adult enrollment periods. As in the case of the follow-up survey of secondary students, the return rate must be reasonably high, so that valid conclusions may be drawn, and there are sufficient data to partition the overall results by several program and student characteristics.

In the statewide occupational education reporting system, a unit record file is used to meet information requirements on occupational enrollments and follow-up results. In other words, unaggregated data on individual students are maintained. The availability of unit record data is a major design specification of the statewide OERS and systems defined as being compatible with OERS. Unit record data provide the capability to tabulate data elements in a variety of ways. This capability is needed in order to meet varying and unanticipated information needs. If data were collected and maintained in aggregated form, then new unanticipated information requirements could be met only by re-collecting data. In addition, unit record data provide an audit trail for validating the aggregated frequencies that are reported at the state level. Finally, the conduct of a follow-up survey requires that individual names, addresses and other identifying information are maintained for individual students.

In addition to the requirement for maintaining unit record files, standard definitions of data elements and occupational programs are to be applied statewide, and certain procedures regarding how students are counted, also are defined on a statewide basis. By maintaining standard definitions and counting

procedures, valid comparisons of reported data may be made over schools, districts, and planning regions.

The school district of the City of New York has the largest program of occupational education in New York State. In 1980-81, approximately 135,000 secondary students received occupational education in 120 vocational and academic/comprehensive high schools and special centers, and 14,000 adult students also were served. Because of the substantial size and diversity of the New York City occupational program, a student information system is essential to program planning, evaluation and reporting at a citywide level. At the same time, the size and diversity of the city's occupational program creates a set of unique requirements to be met by a New York City version of OERS.

In a previous project, technical assistance was provided to NYC:OOCE to commence redevelopment and implementation of a reporting system that is compatible with the standards of the statewide OERS. The following was accomplished.

- NYC:OOCE's computer software for processing enrollment and follow-up data was revised and transferred from a small computer used primarily for instruction to the Bureau of Management Information and Data Processing (MIDP), the city school district's main computer facility. MIDP provides a computer environment with adequate capacity to meet NYC:OOCE's data processing needs.

- Acquisition and efficient utilization of a high-speed, programmable optical mark reading (OMR) machine. This equipment enabled NYC:OOCE to improve substantially its procedures for editing results obtained from its annual survey of approximately 175,000 secondary occupational enrollments.

- Redesign and implementation of NYC:OOCE's system for processing adult enrollments and follow-up results. The revised system extended reporting coverage to adult students enrolled in each of the three adult registration terms, as prescribed by state- and federally-mandated reporting requirements.

- Improvements in the system for following up secondary students, in order to attain an acceptable rate of return. The improved follow-up survey has three distinct phases: a) a mail survey that makes use of a sweepstake, b) a search for occupational completers in the enrollment rosters of postsecondary institutions and c) telephone canvassing.

- Revisions in nearly all forms and manual systems to facilitate the collection and processing of data in less time and with less error.

The primary responsibility of NYC:OOCE's small data processing staff is to fulfill the ongoing, mandated requirement of providing current information on occupational enrollments and follow-up results. The necessity of meeting reporting deadlines has limited personnel resources within NYC:OOCE available for the development and implementation of entirely new system designs. Thus system design has proceeded incrementally; most system design and implementation activities have taken the form of revisions to the system that NYC:OOCE utilized before this project began.

B. Technical Assistance Activities

Technical assistance has been provided through this project to the Board of Education's Office of Occupational and Career Education (NYC:OOCE) for the further development and implementation of an occupational education reporting system. The major purpose of these activities is to assist NYC:OOCE in the implementation of an information system whose design characteristics meet the unique needs of New York City's occupational program and also are compatible with the statewide Occupational Education Reporting System (OERS).

From July 1, 1980 through June 30, 1981, technical assistance was provided to NYC:OOCE to meet the following two objectives: 1) to produce locally- and state-required reports of occupational enrollments and follow-up results, and 2) to coordinate NYC:OOCE's occupational education reporting system with the New York City school district's developing student data system.

The second objective of this project's technical assistance activities, i.e., the coordination of the New York City OERS with the city school district's developing student data system, applies only to the collection of information on secondary students. Prior to the current year, all of the data needed to compile reports on secondary occupational enrollments were collected through a special OERS survey of students in their occupational subject classes. During this past year, an opportunity was provided for NYC:OOCE to make use of the student data system that is being developed and maintained by the New York City school district's Office of Student Information Services (OSIS). Utilization of OSIS student files by NYC:OOCE was undertaken to conform with a district policy to reduce redundant data collection and to obtain the advantages associated with obtaining data from a system that is set up to meet the needs of many users at the school building and district levels.

Figure 1 provides a simple, schematic overview of the secondary reporting system that was implemented in the course of this project. As indicated in the figure, most data elements needed for occupational education reporting are collected through a survey of occupational students in their subject classes. However, additional information needed to report enrollments and follow-up findings was to be obtained from the OSIS student data system.*

Figure 2 provides a schematic overview of the occupational education reporting system for adult students. For adult students, data are derived not from a special survey but from the forms used to register students for adult occupational education courses.*

Technical assistance has been provided through this project to NYC:OOCE over a broad range of activities. The major categories of technical assistance activity are described in the following paragraphs.

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* System design details have been described completely in other project documents and are not included in this report.

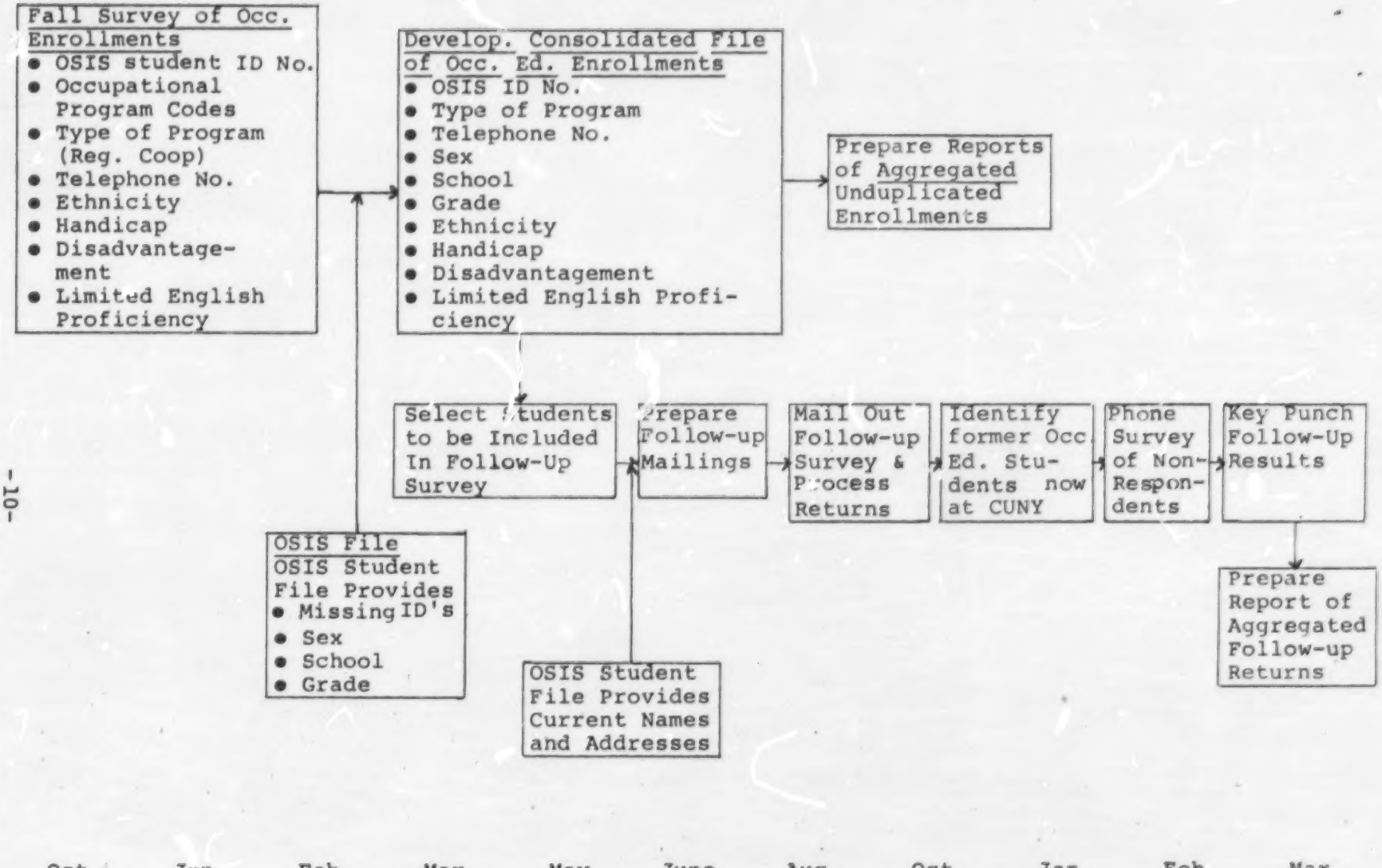

Fig. 1. Overview of the occupational education reporting system for secondary students.

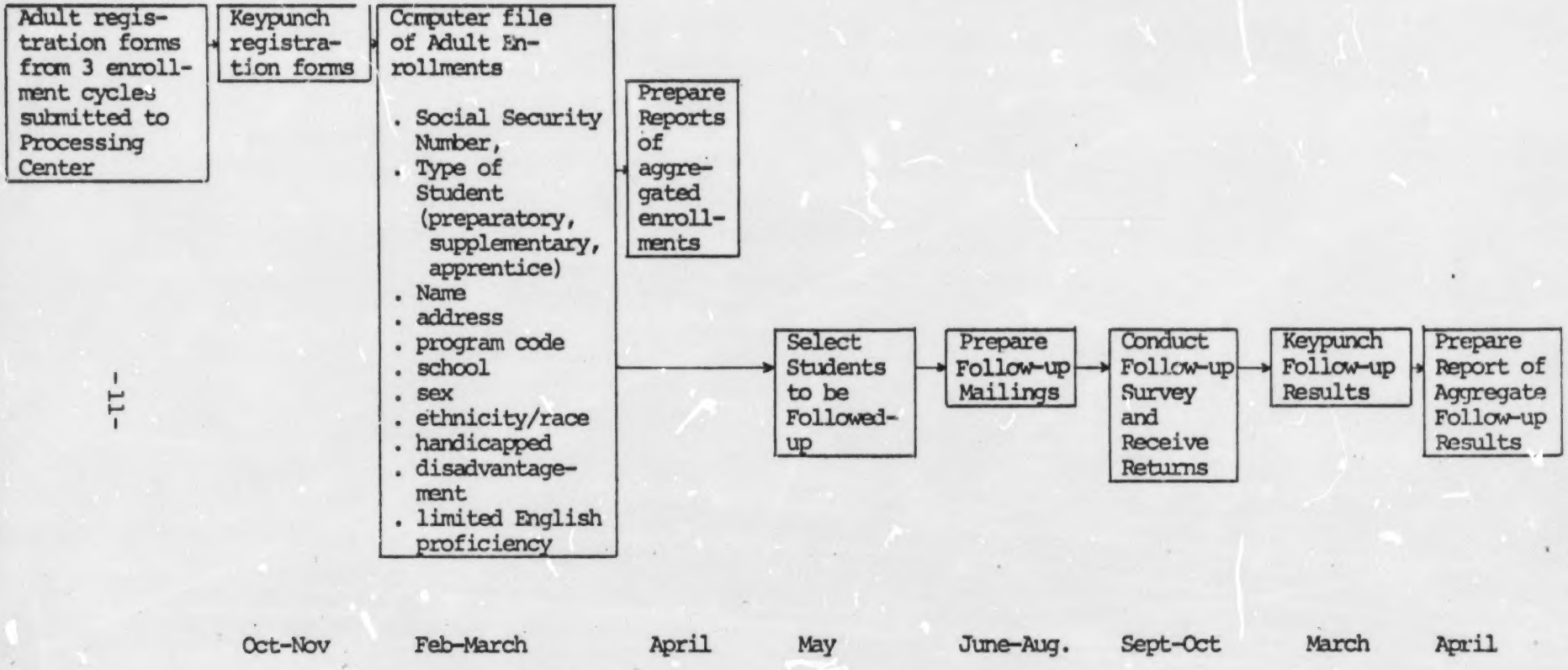

Fig. 2. Overview of the occupational education reporting system for adult students.

Technical assistance to specify and develop a front-end software system. In order to make effective use of the OSIS student data file, it was necessary to develop a software system that would retrieve information from the OSIS file, merge the data obtained from this file with the data obtained from the occupational enrollment survey, and create a computer file of edited student enrollments that could be used by NYC:OOCE's regular computer software to develop enrollment reports. This new software system was termed the front-end system, since its purpose was to prepare data for the regular, formerly used software. Technical support was provided to NYC:OOCE staff to specify the logic of the front-end system and to develop software code for several of the system's programs.

Additional design changes to make effective use of the OSIS data file. In addition to the front-end system, technical assistance was provided to specify additional changes in the software system needed to make effective use of the OSIS student data system and student identification numbers.

Back-up strategy and software. OSIS data files were implemented for the first time this past year. As a consequence, there was uncertainty with respect to when the OSIS files would be available for utilization by NYC:OOCE. In addition, it was not possible to test adequately in advance of their use the many system changes and additions that were made by NYC:OOCE to accommodate the utilization of OSIS student files. Therefore, since it was anticipated that difficulties might be encountered in obtaining or making effective use of the OSIS data files, it was necessary to develop back-up procedures which would insure that NYC:OOCE could meet its reporting obligations in a timely manner. Technical assistance was provided through this project for the development of back-up procedures. These procedures were designed to enable NYC:OOCE to compile reports on students enrolled in occupational programs, even if data from OSIS files could not be used.

Forms design and instructions. Technical support has been provided for the design of forms and instructions. Changes in forms and instructions were required primarily to accommodate the utilization of the OSIS student file and student identification numbers.

Manual Systems. Technical support has been provided for substantial modifications of manual systems. The modifications were necessitated by the decision to make use of the OSIS student file and student identification numbers. Additional changes were required by the utilization of a recently-acquired, programmable optical mark reading machine. This equipment facilitated the identification of data errors at the point of data entry. Manual editing procedures were developed to make effective use of the new mark reading equipment.

Liaison with OSIS. Technical assistance has been provided to help NYC:OOCE to: 1) specify its requirements for access to the OSIS data files, 2) specify and obtain from OSIS directories of student data, 3) obtain general information about the status of the OSIS student files and student identification numbers, and 4) identify areas of potential difficulty in making use of the OSIS files.

Analysis of follow-up requirements for cooperative education. Each year, the High School Division's Bureau of Cooperative Education carries out a follow-up survey of students who complete a cooperative occupational program and have graduated from school. This survey meets the Bureau's needs, but does not meet mandated requirements for data on completers of cooperative occupational education programs. Technical assistance was provided to NYC:OOCE to: 1) analyze the methods and results of the follow-up study conducted by the Bureau, and 2) determine how NYC:OOCE could augment its own follow-up procedures in order to accommodate the Bureau's special information needs. As a result of NYC:OOCE's analysis, cooperative

students were included in NYC:OOCE's uniform follow-up study of students from all occupational education programs. This inclusion of cooperative students in the regular follow-up survey was considered to be successful by both NYC:OOCE and the Bureau of Cooperative Education.

Follow-up sweepstake and awards ceremony. As part of a general effort to increase the rate of response in its follow-up survey, NYC:OOCE conducted a sweepstake as part of its follow-up mailings. Students who returned a completed entry ticket were eligible to win a prize. In order to focus public attention on the follow-up findings of former student enrollees, a public drawing and awards ceremony were planned. Assistance was provided for specifying drawing procedures, organizing the awards ceremony and interpreting follow-up results for a press release.

Analysis of follow-up results. The follow-up return rate for secondary students was a respectable 51% of the entire universe of occupational education students who were seniors in the previous academic year. This return rate is more than sufficient to justify extensive analyses of the follow-up findings. Technical assistance was provided through this project for making use of SPSS, a software package available to the city school district for conducting statistical analysis. Assistance was given to enter follow-up data into SPSS files and to use SPSS software routines to carry out the necessary analyses.

Rectification of unanticipated problems. Many changes in NYC:OOCE's occupational reporting systems and procedures were implemented this year. In addition to the changes that were made to improve NYC:OOCE's reporting systems, another category of system changes resulted from the decision to retrieve data from the CSIS student files. Because of time and resource limitations, it was not feasible to test completely all of the system modifications before major data collection and processing activities were begun. Under such circumstances, it is inevitable that unanticipated problems are discovered after data collection and processing activities are under way.

Technical assistance was provided as needed to help NYC:OOCE's data processing staff to rectify problems as they were discovered, with as little lost time as possible.

Development of specific plans to meet next year's occupational enrollment and follow-up reporting requirements. Planning for next year's data acquisition and processing does not fall within either of the two technical assistance tasks that are included in this project's work statement. However, technical assistance activities were extended to include support for planning the revisions in data collection and processing that are to be undertaken from July of '81 to June of '82. Plans were developed to: 1) revise forms and data processing procedures where needed, 2) involve the schools more directly in carrying out follow-up surveys of their own graduates, 3) involve the schools more directly in data validation activities, and 4) conduct a survey of employers who have hired students formerly enrolled in occupational programs. Technical assistance to carry out these planning activities culminated in a proposal from NYC:OOCE to the State Education Department for the further design and implementation of the New York City OERS.

Liaison with the State Education Department. In carrying out the technical assistance activities described above, continuous communication has been maintained with the State Education Department's Office of Occupational and Continuing Education and with the Information Center on Education, through a series of meetings and memoranda. As a result of these liaison activities, the State Education Department has been able to provide direction for the system development and implementation activities that have been undertaken in the course of this project.

III. The Development of Functional Specifications for Meeting Information Requirements of the New York City School District's Office of Occupational and Career Education

Tasks 3 and 4 of this project's work statement are concerned with the development of functional specifications related to the information needs of NYC:OOCE. Information needs were to be identified (Task 3), and functional specifications and system design concepts were to be developed (Task 4).

During the course of this project, emphasis was placed on three major applications for which data processing support is needed. These three applications were not selected from a comprehensive list, as suggested by Task 3, but have been selected because of the immediate need to obtain information for local planning and state compliance. The three applications that received attention in this project are:

- a system for program monitoring and evaluation,
- enrollment and follow-up information from a comprehensive student information system, and
- development of a comprehensive student information system for adult education.

Progress made during the course of this project on the development of these applications is discussed in the following paragraphs.

A. Program Evaluation

The Vocational Education Amendments of 1976 require the states to evaluate the effectiveness of programs that are being assisted with funds obtained under the Vocational Education Act of 1963. Each program within the state which purports to impart job entry skills is to be evaluated. The regulations promulgated to implement the legislation require the states to "...evaluate in quantitative

terms the effectiveness of each formally organized program or project supported by federal, state and local funds." Both the legislation and the regulations require the evaluation to be completed during the period 1977-1982.

Pursuant to this federal mandate, the State Education Department's Office of Occupational and Continuing Education has developed a system for statewide evaluation. At the request of the State Education Department and NYC:OOCE, project staff reviewed the statewide evaluation system. In this review, emphasis was placed not only on the substantive aspects of the state evaluation system but on procedural aspects as well. This project's personnel also reviewed the program monitoring and evaluation activities that currently are under way within NYC:OOCE and that are planned for the immediate future. From these reviews, specifications were developed for changes and additions in NYC:OOCE's current monitoring and evaluation processes. These changes permitted NYC:OOCE's evaluation processes to subsume a substantial number of evaluation criteria that are part of the state-promulgated evaluation system.

In concert with NYC:OOCE and the State Education Department's Office of Occupational and Continuing Education (SED:OOCE), consideration was given to several procedural changes that would facilitate the implementation of the statewide system in the New York City school district.

During the course of this project, functional specifications for program evaluation were formulated. Final agreement between NYC:OOCE and SED:OOCE was not reached.

B. Enrollment and Follow-up Data from a Comprehensive Student Information System

During the past year, it was possible to limit the number of data elements that were collected on NYC:OOCE's special survey of occupational enrollments; some of the

required data were obtained directly from the student data files of the Office of Student Information Services. The utilization of OSIS student identification numbers and other data is advantageous to NYC:OOCE. The major advantages are described in the following paragraphs.

The OSIS student data system maintains a unique identification number for each student enrolled in the city's schools. Once assigned, the number remains with the student throughout his or her tenure in the school system. The data elements currently associated with this number in the OSIS files include: student name, address, grade, school, official class, sex and date of birth.

Current addresses. In NYC:OOCE's former reporting system, it was necessary to collect names and addresses several months before they were needed for conducting follow-up studies. Because the OSIS files are intended to meet a variety of administrative needs, the files' data elements -- including addresses -- are to be updated continuously. Thus the utilization of addresses provided by OSIS should result in a more effective follow-up study; the use of current addresses will result in the delivery of NYC:OOCE's follow-up mail to a greater proportion of former students.

Error-free names and addresses. In NYC:OOCE's former reporting system, names and addresses are obtained by requiring students to darken appropriate boxes on optical mark reader forms. Errors are made by students in completing these forms. Since OSIS files will serve many ongoing administrative applications, it is anticipated that school-based personnel will provide valid names and addresses, and also will help to update files with corrected information.

Tabulation of updduplicated counts. For certain reporting purposes, NYC:OOCE's reporting system must be able to provide frequencies of students served. Course enrollment frequencies are higher because students often are enrolled in two or more occupational courses. NYC:OOCE's present procedures for identifying duplicate enrollments are cumbersome and error-prone. The student identification numbers maintained by OSIS will make possible a straightforward approach to the elimination of duplicates.

Establishment of longitudinal files. Since student identification numbers will be assigned to students throughout their tenure in the city school system, NYC:OOCE will have the capacity to combine student enrollment data from successive academic years and establish longitudinal files. Such files will enable NYC:OOCE to follow up students who complete their occupational training before their senior year. The files also will enable NYC:OOCE to carry out analyses to support program planning and evaluation. For example, longitudinal files would enable NYC:OOCE to assess the effects of breadth and intensity of training on follow-up results and on other measures of program effectiveness.

Research on the effects of occupational education. It is the intent of the city school district to include OSIS identification numbers in files of attendance information, grades, test results, and other educational data. If NYC:OOCE has the OSIS identification numbers in its OERS student files, it becomes possible to identify and retrieve data on occupational education students. Thus NYC:OOCE would be in a position to conduct research that would serve to demonstrate the impact of occupational education on reading levels, computational skills, attendance patterns and other factors. Studies of this type could be of national significance, serving to demonstrate that occupational education provides substantially more to students than voca-

tional skills and job placement. NYC:OOCE is very interested in pursuing this type of research.

The current and potential advantages described above have resulted in a substantial interest within NYC:OOCE to make full use of the OSIS student data systems. However, it became evident during the course of this project that the current model for coordinating OERS and OSIS data collection and processing activities is in need of major revision.

In the current approach, it remains necessary for NYC:OOCE to collect most of the data it requires through a massive, single-purpose survey of all occupational enrollees in their subject classes. Although a few of the data elements formerly collected through this survey are now retrieved from OSIS files directly, this new approach does not materially alter the very substantial burden associated with special data collections for occupational education. As long as special forms are distributed to the students who are enrolled in occupational programs, the schools will continue to have the burden of distributing and collecting the forms, and validating the data that are provided. A genuine reduction in the reporting burden would occur when the entire enrollment survey is eliminated as an independent activity. This can happen when most -- if not all -- of the data needed for occupational reporting are available from a more comprehensive student information system that has been set up to serve a number of administrative and instructional needs.

Because of the substantial interest on the part of SED:OOCE and NYC:OOCE to conserve the resources required to carry out annually a special survey of 175,000 occupational enrollees, project personnel worked on developing approaches in which OSIS could provide more information on occupational students than is provided currently.

Beginning February 5th through June 30th, 1981, project personnel participated in the OSIS Technical Advisory Committee, a group that provided consultative advice to OSIS on planning

an expanded student data system. Project personnel represented the needs of NYC:OOCE in these meetings, so that information requirements on occupational education would be known to OSIS planners.

In addition to its work on the OSIS Technical Advisory Committee, project personnel supported the efforts of NYC:OOCE to convey its needs for information to the OSIS Application Transfer Team, a group charged with developing specifications for the further development of the OSIS student data system.

As a result of these meetings and additional working sessions with NYC:OOCE and OSIS personnel, a consensus has emerged regarding the desirability of ultimately eliminating the single-purpose occupational enrollment survey.

In order to meet NYC:OOCE's information requirements within the OSIS student data system, a number of issues need to be resolved and system design problems overcome. The issues requiring resolution are 1) the inclusion of sensitive data elements in OSIS files (e.g., ethnicity, disadvantagement) and 2) the districtwide utilization of standard course codes. At present, a variety of idiosyncratic course coding structures are in use. These are not translatable into state- and federally-prescribed occupational education program codes. The major design problem to overcome involves the treatment of subject classes. The OSIS data system currently is oriented toward official classes (i.e., homerooms) where most administrative activities take place. However, some of the information needed by NYC:OOCE is related to subject classes.

Project staff have worked with OSIS personnel and the Application Transfer Team to make these and other issues salient, and to suggest alternative designs for overcoming the problems. As of this writing, the Application Transfer Team has not completed its work in developing detailed functional specifications.

Another source for obtaining data to meet NYC:OOCE's information requirements is UAPC, the University Applications Processing Center. For administrative applications, UAPC currently maintains student files for 54 of New York City's high schools. The use of UAPC by NYC:OOCE has the potential of eliminating the occupational education enrollment survey from the 54 high schools that purchase UAPC's administrative data processing services. During the course of this project, the potential for using UAPC's student files was explored and specifications developed. The following activities would have to be carried out before UAPC's files could be used effectively by NYC:OOCE.

- New procedures for identifying students as disadvantaged would need to be developed. These procedures would relate student addresses to census data on poverty areas.

- UAPC's files contain unique course names and codes for each school served. These codes would need to be translated into standard occupational program codes. Substantial contact with each of the schools would be necessary to effect this translation.

- Ethnicity would need to be obtained directly from the schools, since ethnic data are not contained in UAPC's files.

NYC:OOCE has determined that the efforts required to use UAPC's files cannot be undertaken for the present. Moreover, the use of UAPC's files would require the maintenance of a dual system, since UAPC serves just over half of the high schools, and its files contain data on less than half of all secondary occupational students.

C. An Information System for Adult Programs

1. Background

Much redundancy exists in current reporting requirements for adult and continuing education programs. Local education agencies are required by the Occupational Education Reporting System (OERS) and other state and local reporting systems to complete a variety of forms for different programs and purposes, and on uncoordinated schedules. These forms often contain many of the same fundamental data elements.

In New York City, the state's largest local education agency, the Office of Occupational and Career Education's (NYC:OOCE) Adult Coordinating Unit administers a wide range of programs for adult learners. These include occupational education programs, basic education programs, drug abuse prevention programs, mental hygiene programs, work experience programs, and consumer homemaking programs. Support for these programs is made available through a variety of funding sources (e.g., the Vocational Education Act, the Adult Education Act, Title XX of the Social Security Act, the State Departments of Social Services and Mental Hygiene, and the Comprehensive Employment and Training Act), each with its own set of fiscal and programmatic reporting requirements.

With the exception of the adult occupational education programs, all of New York City's adult data collection and reporting activities currently are performed manually. The paperwork necessary to meet the reporting requirements associated with each of the various adult programs imposes an enormous clerical burden on both administrative and instructional personnel. Redundancies and irrelevancies present within the current reporting systems exacerbate the burden on staff, introduce error, and needlessly constrain the resources available for program operations.

The project staff's initial approach to this problem was to review the adult program information requirements of OERS and other state systems with the objective of establishing a more unitary system of data collection at the state level. By effecting minor changes in the definitions of certain data elements and in reporting schedules, it might be possible to specify a unitary state system for adult reporting that would serve simultaneously a number of the State Education Department's reporting requirements. OERS might be expanded to serve these additional requirements, or OERS could obtain from a unitary system the information needed to meet the reporting requirements related to adult occupational education.

An alternative approach to the problem would be to develop a consolidated management information system at the local level. This system would be capable of producing efficiently the information needed to meet a large variety of state and local information requirements. Data on adult programs then could be collected once at the local level, incorporated into a flexible computer file, and accessed, when necessary, to meet both state and local reporting requirements. While both of these approaches are being pursued, the latter has been emphasized in this project.

A consolidated, automated approach to adult reporting in New York City would reduce substantially clerical efforts at the local level, and, at the same time, produce more valid and timely information for program managers and monitors.

2. Activities

During the past year of this project, staff commenced work on the development of a consolidated management information system for adult programs in New York City. Project activities included:

- analysis of current adult program reporting requirements and procedures;
- review of data elements contained within the various adult reporting forms;
- development of specifications for an interim intake form and procedure for adult occupational education programs; and
- design and implementation of an interim intake form and procedure for registering adults into summer and fall, 1981 occupational education programs.

Each of the above activities are described below.

Analysis of reporting requirements and procedures. Project staff have begun to analyze current state and local adult reporting requirements and procedures. To date, a number of reporting forms have been organized into such categories as: initiator, purpose, funding source and

reporting schedule. Such an organization readily reveals commonalities between (i.e., redundancies) and idiosyncracies within the various forms and procedures. Concurrently, staff have begun to array the set of data elements and definitions that are contained within the various reporting forms.

Review of data elements. Staff have commenced an analysis of the data elements and definitions included within existing adult reporting forms. It has been found, for example, that most of the data elements contained in the adult occupational education program's intake forms also are present in intake forms used for adult basic education programs. Consolidating existing intake forms from these two adult programs should therefore be a relatively simple matter.

Since consolidated forms and procedures will bring about a number of fundamental changes in the operation of local reporting systems, staff have encouraged the active involvement of those key personnel who will be most affected by the changes. This involvement will give the best assurance that the participants will develop ownership of and confidence in the new procedures, and will work hard to see them implemented properly. Therefore, project staff have had a number of meetings with Anthony Baldino, NYC:OOCE's Adult Coordinating Unit Director, representatives of the Planning, Evaluation & Research Unit, and the managers of New York City's adult occupational education, basic education, high school equivalency and consumer homemaking programs, in order to begin to involve them in the process of assessing and specifying their own needs for information. From these assessments, and from analyses of existing reporting requirements, staff will be able to develop a consensus with respect to design specifications for consolidated forms and procedures that will serve simultaneously the reporting requirements of each of New York City's adult programs.

Development of specifications. Recent changes in reporting requirements for adult occupational education

programs necessitated immediate (prior to summer, 1981 registration) revision of the form used in New York City for registering adults into this program. Project staff used this opportunity to foster collaboration between NYC:OOCE's Planning Evaluation & Research personnel and the administrators of the adult occupational education program on the development of specifications for a revised interim intake form.

Under the old procedure a student registration card was completed by the registrant at the time of registration, and sent immediately to central data collection personnel for subsequent analysis. Concurrently, a copy of the student registration card was forwarded to the receiving classroom teacher for use as an attendance and grading record (an attendance grid and other information were printed on the back of the card).

This procedure produced a number of data analytic and reporting problems. Student registration cards returned to data collection personnel under the old procedure were found to contain many omissions, as well as many errors. Registrants were unable to complete accurately population category items (e.g., disadvantaged, handicapped, limited English speaking, etc.), and often were confused about course titles, occupational course codes and other data elements included in the registration form.

In addition, under the old procedure, data for all registrants, regardless of how long they remain in the program, were returned to data collection personnel for analysis. Since data collection personnel had no way of distinguishing registrants who actually participated in the occupational education program from those who withdrew immediately after registration, all registrants were included in subsequent analyses and follow-up activities. This condition created much unnecessary work for program analysts. Specifications for the new interim intake form and procedure would need to account for the above problem areas.

Finally, working in collaboration with Planning, Evaluation & Research personnel and project staff, occupational education program administrators were able to specify additional items to include in the revised registration form that would support their needs for program management, planning and evaluation information.

Design and implementation of an interim form and procedure. Project staff provided technical assistance to the Planning, Evaluation & Research Unit on the design of an interim intake form and registration procedure for adult occupational education programs. This form meets the specifications described above. The form and procedure that were developed:

- requires classroom teachers to review registrant data for completeness and accuracy, and to complete any missing information;
- requires classroom teachers to hold onto the registration forms for a sufficient time to allow the teacher to accurately complete population category and other student information, and to make determinations about which registrants never attended class, which withdrew since classes began, and which were currently participating in the program. For those students who have withdrawn, teachers are required to enter the date of withdrawal, and if known, the reason for that withdrawal; and
- contains the additional items specified by the occupational education program administrators.

Project staff developed instructions for completing and returning the new forms, and provided training to occupational education program site coordinators to insure that the forms would be completed and procedures would be followed properly. The interim intake forms were printed and distributed to the adult occupational education program sites, and will be used to register adult students into

summer and fall, 1981 programs. (Summer registration begins July 6, 1981.) It is anticipated that, by spring, 1982, adult occupational education program registration forms and procedures will be consolidated with forms and procedures from a number of New York City's other adult programs.

IV. Specifying Refinements in the State Education Department's Occupational Education Reporting System

The specification of refinements in the State Education Department's Occupational Education Reporting System (OERS) is Task 5 of this project's statement of work. In accord with the project proposal, the specification of refinements to OERS was to include but not be limited to:

- refinements needed to accommodate the distributed data processing network to be implemented for the New York State School Computer Services System (NYSSCSS);
- refinements needed to take advantage of flexibilities in federal reporting requirements; and
- refinements in data gathering strategies.

Because of a decision by the State Education Department's Office of Occupational and Continuing Education (SED:OOCE) to use the enrollment data gathered through OERS for allocating VEA funds, emphasis has been placed on expanding the coverage of OERS to local education agencies that are not receiving OERS services. More complete OERS coverage is required in order to obtain from as many local and regional education agencies as possible, relatively standard enrollment data for use in the allocation formula.

Project personnel assisted the Office of Occupational and Continuing Education and the Information Center on Education in developing a plan for accelerating the implementation of OERS through the utilization of regional occupational education planners. In addition, project personnel assisted the Information Center on Education in formulating procedures for the OERS data

processing centers to validate information that they received from local education agencies.

In addition to the refinements in OERS described above, the State Education Department requested project personnel to expand its activities to include refinements for the Occupational Education Data System (OEDS), a system which OERS may ultimately replace in most local education agencies. Project personnel assisted the State Education Department Information Center on Education in a major revision of OEDS forms and instructions. The purpose of these revisions was to reduce the number of errors made by local education agencies in completing the forms, and generally to increase the validity of the information reported.

Project personnel also assisted ICE in developing procedures to identify completed OEDS forms that are likely to contain erroneous data.

The results of the system refinements made to OERS and OEDS in the course of this project have produced more valid and complete enrollment data needed for the allocation of funds and for other state purposes. In addition, the implementation of OERS in all BOCES has been accelerated successfully.

V. Assessing the Feasibility of Extending the Scope and Capabilities of the State Education Department's Instructional Support System for Occupational Education (ISSOE)

Tasks 6, 7 and 8 of the work statement are related to assessing the feasibility of extending the scope and capabilities of the State Education Department's Instructional Support System for Occupational Education (ISSOE). In this group of three tasks, project personnel proposed to assist the New York State Education Department's Office of Occupational and Continuing Education (SED:OOCE) to review the current status of ISSOE (Task 6), to develop recommendations and plans for extending ISSOE to meet new priorities (Task 7), and to develop recommended functional specifications for data processing support that will be required by ISSOE (Task 8).

Since the tasks listed above were approved in the summer of 1980, new directions in SED:OOCE's plans and activities in the area of curriculum development exerted a major influence on efforts to fulfill these tasks. SED:OOCE's interest shifted increasingly from the ISSOE approach to another process, conceptually similar to the one implemented through ISSOE but significantly different in structure and devised to meet a somewhat different and more current set of needs. This new process was developed concurrently with ISSOE and used to revise the business education curriculum.

Rather than extending ISSOE to meet new priorities (the assumption from which Tasks 6 and 7 proceed), SED:OOCE has adopted this new process, commonly referred to as futuring, as its principal vehicle to establish competency-based occupational education in New York State, and will incorporate ISSOE products and organizational capability into the futuring process wherever possible.

As required by Task 6, project personnel carried out a review of the current status of ISSOE and concur in SED:OOCE's conclusion that the incorporation of ISSOE into the futuring process offers the highest likelihood of meeting New York State's current needs for competency-based curriculum development.

Accordingly, additional efforts to complete Tasks 6 and 7 focused on the futuring process and on its present or prospective application to curriculum restructuring in Business Education (futuring completed; curriculum approved by the Board of Regents; curriculum elements currently being designed and field tested); Health Service Occupations (futuring completed); and Occupational and Practicual Arts Education, which consists of trade and industrial, agricultural, distributive, home economics, and industrial arts programs (futuring being organized now). Efforts undertaken in connection with Tasks 6 and 7 have included the following.

1. A review and analysis of the development to date of the Business Education curriculum and the futuring process used to develop it, including participation in Department-sponsored activities in the field related to the implementation of this curriculum. (Understanding of the futuring process and its application to the development of the new Business Education curriculum is essential to carry out efforts in connection with Task 8, described later in this report.) This review is not yet completed.
2. Participation in planning meetings and related field activities connected with the upcoming futuring of curricula in Occupational and Practical Arts Education.

Work carried out on Task 8 dealt with the development of functional specifications for a reporting system necessary to insure the effective and efficient management of the new curricula being and to be developed through the futuring process. SED:OOCE's long-range objective is not limited to restructuring curricula

to meet present needs, but extends to the development of comprehensive instructional management for occupational education in New York State. In addition to the futuring process, in cooperation with the State University, SED:OOCE has already developed procedures for training (and retraining) teachers to use the new curricula. With the addition of reporting capability, the goal of statewide, comprehensive management of all instructional resources flowing to occupational education will be closer to realization.

The inception of work on Task 8 was deferred until late in the period of performance of this contract because of SED:OOCE's need to reorganize its personnel to meet the requirements of the futuring process. Compared to ISSOE, the futuring process is more centralized and requires SED:OOCE to take on a complex role of statewide process manager while simultaneously providing technical assistance to locally- and regionally-controlled activities through which statewide curricula are defined, developed and implemented. Once the internal changes in SED:OOCE had progressed sufficiently, work on this task was begun.

After a series of meetings with SED:OOCE staff members concerning possible reporting requirements for the new occupational curricula, it was apparent that no consensus currently exists within SED:OOCE concerning the functional or detailed requirements for such a reporting system. Therefore, a design process was devised to enable SED:OOCE to determine systematically and to consensually validate the functional and detailed specifications of the reporting system that will be developed. In the remainder of this section, this design process is described in detail.

SED:OOCE is developing the new occupational curricula in a staggered fashion, with the business education curriculum currently the most advanced. Completion of all curricula is still many years away. Rather than waiting until all curricula are completely developed before beginning to design the reporting system, SED:OOCE has elected to begin now to design a reporting system

around the new business education curriculum, but to use a design process that will assure to the greatest possible extent the eventual successful application of the system to the remaining new curricula. Furthermore, to assure the eventual successful implementation and maximum effectiveness of the reporting system, the design process will be constructed to include, as participants, those persons and representatives of agencies who will be providers and users of reporting system information. This broad-based approach to design should result in the highest likelihood that all important needs for information will be met, and that the cooperation and support of all providers and users of information will be secured.

The overall process of bringing the reporting system (or any other system, for that matter) into operation and operating it can be viewed in terms of four consecutive stages: design, development, implementation, and maintenance. Although this report deals only with the first stage of this process, the following brief description of the four stages is included to establish a logical context and a view of what lies ahead.

Stage 1: System Design

a. Determine the functional (i.e., general) specifications of the system, including organizational specifications.
b. Construct a System Development Plan to develop all system elements, including preliminary cost and time-to-completion estimates (i.e., determine the detailed specifications of the system).

Stage 2: System Development

Execute the System Development Plan (including the realization of all manual and computer software, and all procedures).

Stage 3: System Implementation

a. Install the system on a pilot basis (field test).

b. Iterate the system design and modify system elements as required.

c. Install the system on scale.

Stage 4: System Maintenance

Evaluate system performance at regular intervals; redesign, extend or modify the system as needs change and experience accumulates.

A seven-step design process was devised to carry out Stage 1. This process involves the following groups, to be constituted by SED:OOCE.

- a Project Management Group, consisting of the Assistant Commissioner for Occupational and Continuing Education, other senior SED:OOCE staff members designated by him, and project staff.

- a small Design Group consisting of SED:OOCE staff members currently involved in developing the new business education curriculum, and project staff.

- a larger Review Group consisting of SED:OOCE staff members from other occupational program areas and other offices and bureaus of SED:OOCE, and project staff.

- the Business Education Area Leaders, consisting of field staff currently coordinating the development of new business education curriculum elements throughout New York State.

The relationship among these groups, and the organizational structure to be used to carry out the design of the reporting system, are shown in Figure 3.

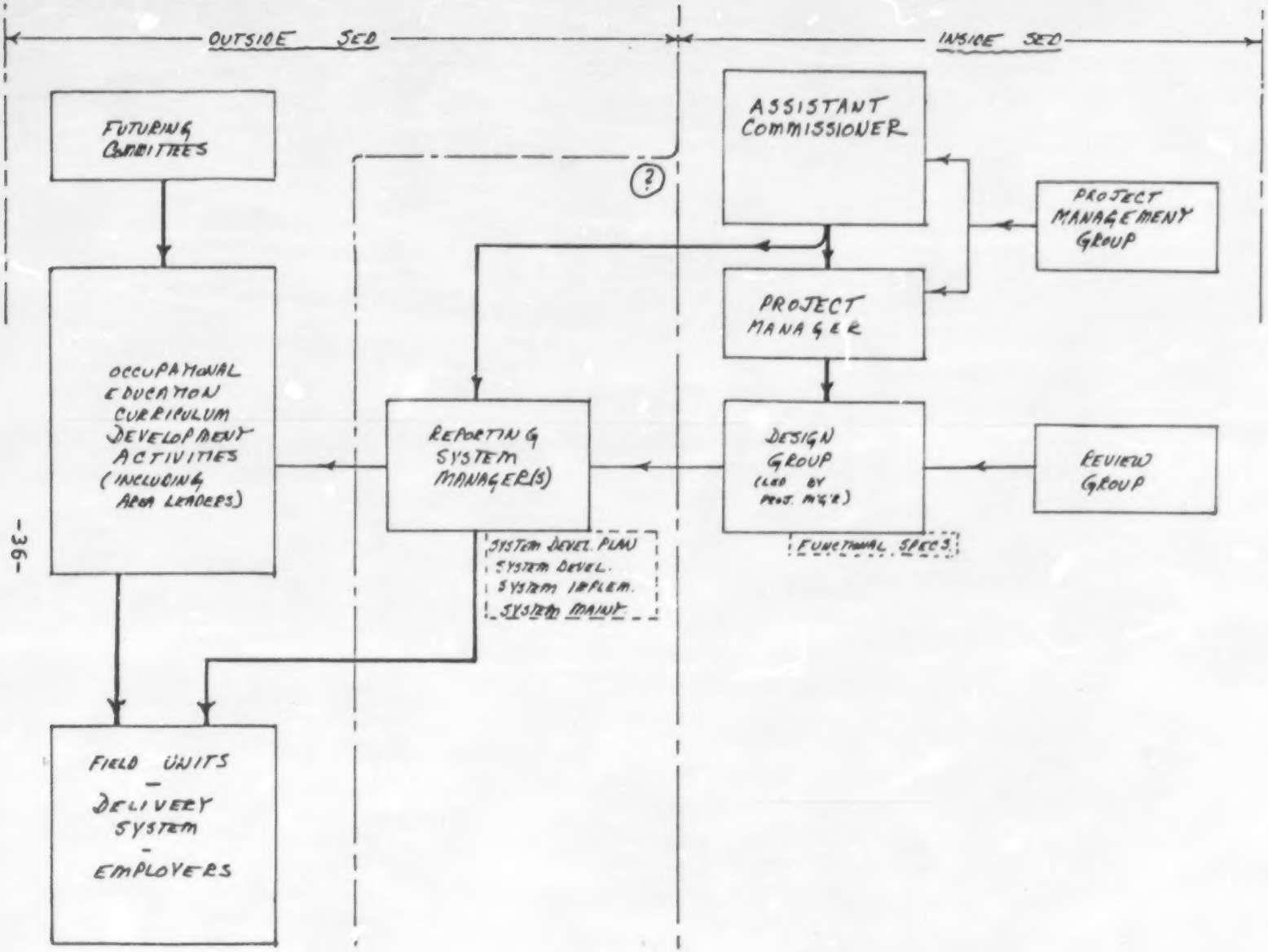

Fig. 3. Schematic of proposed approach to developing a reporting system.

Stage 1a:

Determine the Functional Specifications of the Reporting System

Step 1: Develop preliminary functional specifications for the reporting system, including: purposes for which the information will be used; prospective users of the information; prospective participants in the system development process; prospective organization and control of the reporting system.

- The project Management Group develops guidelines and suggestions for the Design Group with respect to purposes, prospective users, and prospective participants.
- Using these guidelines and suggestions, the Design Group prepares preliminary functional specifications, solely from a business education perspective, with respect to purposes, prospective users, and prospective participants.
- The Project Management Group prepares preliminary functional specifications for the organization and control of the reporting system.

Step 2: To the extent possible without compromising the needs of business education, extend the functional specifications prepared by the Design Group (purposes, users, participants) to meet the needs of other program areas being futured and other SED:OOCE offices and bureaus.

- The Review Group reviews the preliminary functional specifications and suggests modifications.

- The Design Group incorporates into the functional specifications the modifications suggested by the Review Group, to the extent possible without compromising the needs of business education.

- The Design Group generates a design memorandum identifying any unreconciled prospective differences in functional requirements between business education and other occupational program areas being futured.

Step 3: Establish final specifications for the organization and control of the reporting system, including designation of the individuals who will manage the reporting system.

- (This step will be determined by SED:OOCE.)

Step 4: Establish the role of the Business Education Area Leaders in constructing and carrying out a System Development Plan.

- The Project Management and Design Groups present the preliminary specifications to the Business Education Area Leaders, and obtain their suggestions for modifications (particularly with respect to prospective participants in the system design process).

- The Project Management and Design Groups modify their specifications as necessary, and obtain agreement for any changes from all appropriate groups.

Stage 1b:

Construct a System Development Plan for the Reporting System

Step 5: Construct an outline of the System Development Plan (SDP), i.e., an inventory of all tasks that need to be completed to design the reporting system.

- The Design Group, augmented by representatives of prospective participants, identifies all major elements (e.g., research and design tasks, planning and scheduling tasks) of a SDP which, when carried out, will result in a student reporting system that meets the functional requirements developed in Steps 1 to 4. (An estimate of the resources required to complete each element of the SDP, and one or more possible participants who will carry out each element of the plan, should be included in the outline.)

- The Design Group reviews the SDP outline with the Review Group and the reporting systems managers, modifies the outline as required, and obtains agreements for the modifications.

Step 6: Obtain endorsement of the SDP outline from the Business Education Area Leaders and all prospective participants in the system design process.

- The augmented Design Group presents the SDP outline to the Business Education Area Leaders, and obtains their suggestions for modifications.

- The augmented Design Group modifies the outline as necessary, and obtains agreement for the modifications from all appropriate groups.

- Business Education Area Leaders and reporting system management representatives present the SDP outline to all prospective participants and secure their commitments to participate in the system design process.

Step 7: Construct the System Development Plan

- Reporting system management representatives and Business Education Area Leaders support and coordinate the efforts of all participants who are completing assigned elements of the SDP.

- The reporting system's managers document and integrate the results of all design efforts.

- The reporting system's managers review the completed SDP with all appropriate groups and obtain their endorsement.